Presentation to NOAA Testbed Workshop

April 14, 2015

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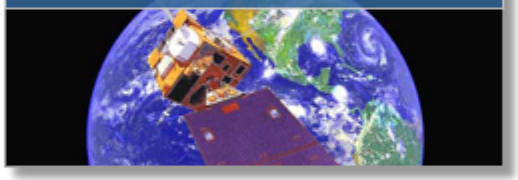
Presentation Outline

1. SPoRT procedures; project selection and management
2. Summary of FY14 Assessments
3. FY15 Progress/Plans

Hydrometeorology Testbed

- Using NOAA and NASA satellites and collaborative models to understand atmospheric rivers and flooding events

Joint Center for Satellite Data Assimilation



- Developing and further improving data assimilation techniques to improve regional weather forecasting

Developmental Testbed Center

- Collaborating on new tools that use NASA and NOAA satellite imagery for model validation

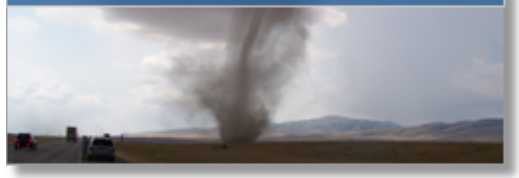
Aviation Weather Testbed

- Providing near real-time satellite imagery and lightning products to aid aviation forecasters

Operations Proving Ground

- Creating new decision support system (AWIPS II) capabilities for next-gen satellites and models

Hazardous Weather Testbed



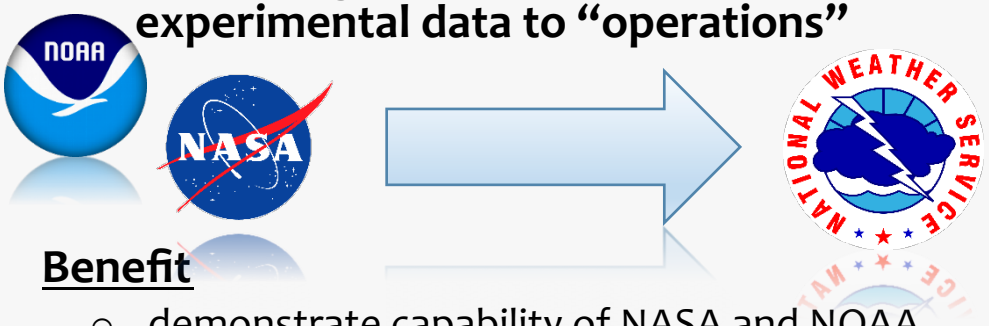
- Exploring the use of lightning data from ground networks as precursors to GOES-R and ISS capabilities

Short-term Prediction Research and Transition (SPoRT) Center

SPoRT is focused on transitioning unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts on a regional and local scale.

- close collaboration with numerous WFOs and National Centers across the country
- SPoRT activities began in 2002, first products to AWIPS in 2003
- co-funded by NOAA since 2009 through satellite "proving ground" activities

Proven paradigm for transition of research and experimental data to "operations"



Benefit

- demonstrate capability of NASA and NOAA experimental products to weather applications and societal benefit
- prepares forecasters for use of data from next generation of operational satellites (JPSS, GOES-R)

Partnerships with NOAA

Over 30 NWS WFOs and All Regional Headquarters

NCEP

National Centers for Environmental Prediction

- Environmental Modeling Center
- National Hurricane Center
- Weather Prediction Center
- Ocean Prediction Center
- Aviation Weather Center
- Storm Prediction Center

SSEC CIMSS CIRA cics-md

NOAA Cooperative Institutes as Data Delivery and Product Development Partners

Legend
- Product Development Partner
- National Center Evaluation Partner
- NWS Regional Headquarters
- WFO Collaborative Partner

SPoRT collaborates with NOAA Cooperative Institutes to develop and distribute products to partnering NWS WFOs and National Centers, providing unique observation and modeling capabilities to support their daily forecasting operations.

SPORT NASA NOAA

Alignment with Operational Interests

SPoRT interacts with NWS WFOs in consultation with NWS Regional HQs, identifying solutions to regional challenges

SPoRT's Strategic Plan and support from NASA HQ provides guidance on how to address NASA science questions

SPoRT receives guidance through solicitations and awards from NOAA's Proving Grounds

Biennial, external reviews (e.g., SAC, right) provide a broad perspective of R2O/O2R opportunities benefitting NASA and NOAA partnerships

2014 SPoRT Science Advisory Committee (SAC)	
Mr. Tom Bradshaw	Meteorologist-In-Charge NOAA/NWS WFO Dallas/Ft. Worth, TX
Mr. Andy Edman	Chief, Scientific Services Division NOAA/NWS Western Region Headquarters
Mr. Lawrence Friedl	Director NASA Applied Sciences Program
Mr. Bill Sjoberg (for Dr. Mitch Goldberg)	Program Support Lead NOAA/NESDIS/JPSS (JPSS Chief Program Scientist)
Dr. Ming Ji	Director NOAA/NWS Office of Science and Technology Integration
Dr. Tsengdar Lee	Program Manager NASA Weather Focus Area
Dr. Bill Lapenta	Director NOAA/NCEP
Mr. Greg Mandt	System Program Director NESDIS/GOES-R Program
Dr. Christa Peters-Lidard	Deputy Director NASA Goddard Hydrospheric and Biospheric Sciences Branch
Dr. David Radell	Techniques Development Meteorologist NOAA/NWS Eastern Region Headquarters
Mr. Kim Runk	Acting Director NOAA/NWS Operations Proving Ground

SPoRT R2O/O2R Paradigm

Bridge the "Valley of Death"

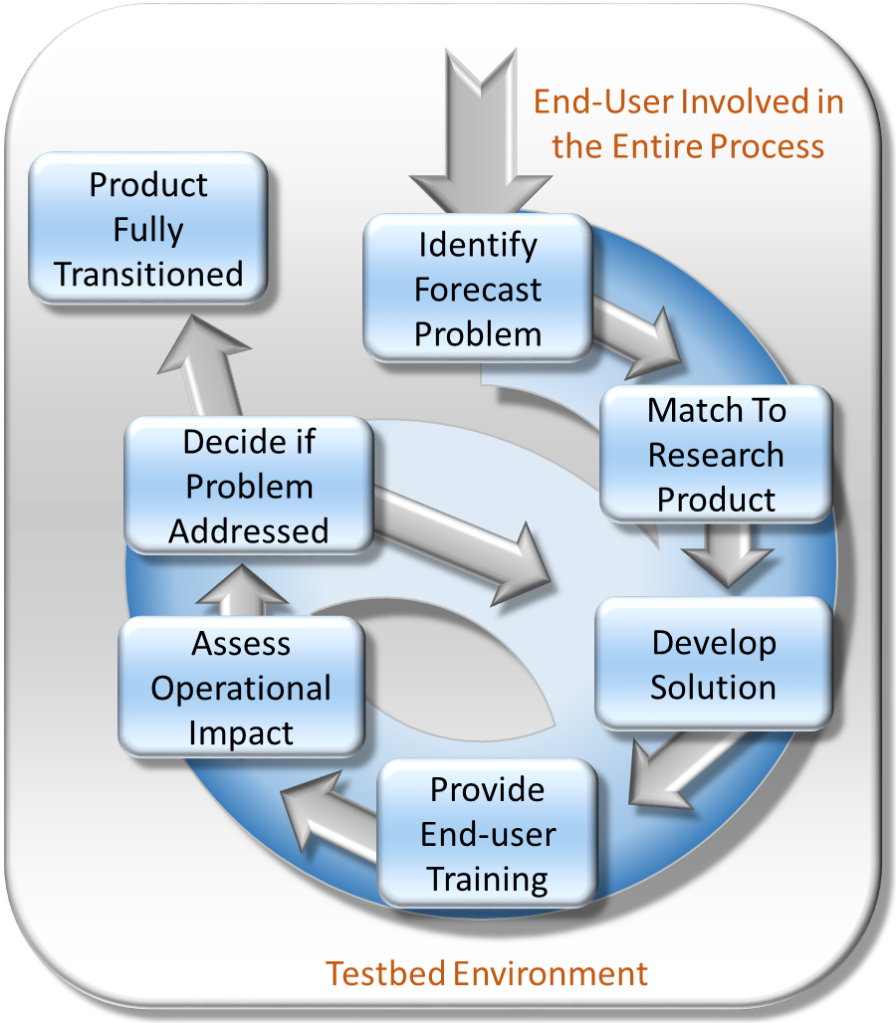
Can't just "throw data over the fence"

- maintain interactive partnerships with help of specific advocates
- integrate into user decision support tools
- Create product training
- Perform targeted product assessments

Use experimental datasets and proxies in advance of operational use to demonstrate utility and impact

Concept has used to successfully transition a variety of satellite datasets to operational users for more than 10 years

Other groups in the community have adopted this paradigm



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NAME	PRODUCTS	WFO / NC	DATE	Description
Snowfall Rate	NESDIS Snowfall Rate	WFOs, NCs	1/14 - 3/14	Microwave-based snowfall rate
NCWCP & NHC Winter Demo.[2]	Air Mass RGB (SEVIRI), AIRS Total Ozone, Hybrid	WPC, TAFB, OPC, SAB	1/14 – 4/14	GOES-R and JPSS products
HWT Spring Exp[2]	UAH GOES-R CI, PGLM, tracking tool (AWIPS II)	NSSL/HWT	5/14 – 6/14	Operational warning testbed
OPG Tracking Tool[2]	Tracking tool (AWIPS II)	OPG	5/14 - 6/14	Total lightning and other applications
Total Lightning	Source Density, Flash Extent Density	CWSUs, SR WFOs	5/14 – 7/14	New networks, cross-collaboration, and aviation use of TL
AWC Summer Exp[2]	GOES-R CI, PGLM mosaic	AWC	8/14	Aviation applications testbed
Drought/Local Flood	LIS and soil moisture	SR WFOs	7/14 – 9/14	Drought monitoring and flood potential
Tropical Proving Ground Demo.[2]	SEVIRI RGB suite, VIIRS DNB, ATMS	NHC	8/14-10/14	GOES-R proxy products for tropical cyclone/wave analysis and forecasting
Snowfall Rate in Alaska	NESDIS Snowfall Rate	AK WFOs, Centers	10/14	Microwave-based snowfall rate at low temps in data-void regions
Aviation and Cloud – High Latitudes	VIIRS and MODIS 24hr Micro RGB.	AFC, AFG, AJK AAWU,	12/14 – 2/15	Compare of new 24hr RGB to NtMicro RGB

Assessment: NESDIS Snowfall Rate Product

SPoRT led effort to evaluate operational utility of NESDIS-developed experimental snowfall rate (SFR) product derived from passive microwave observations

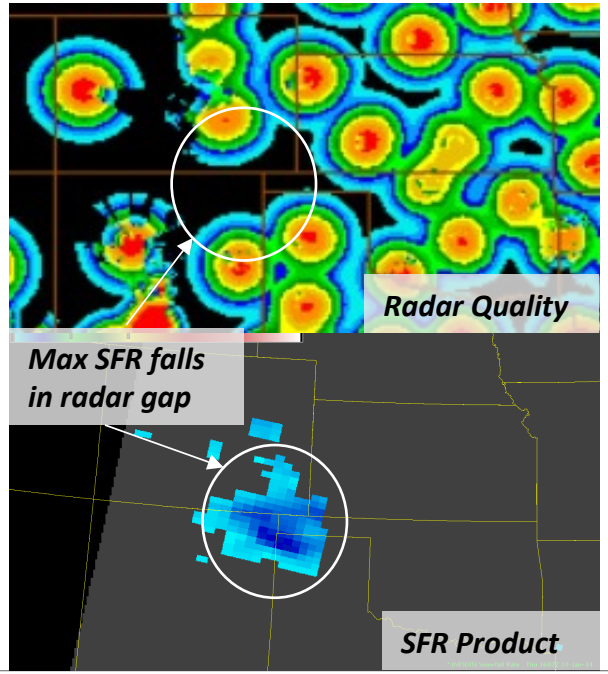
Valuable to determine maximum snowfall intensity not able to be discerned from traditional satellite imagery & radar and to fill in radar gaps

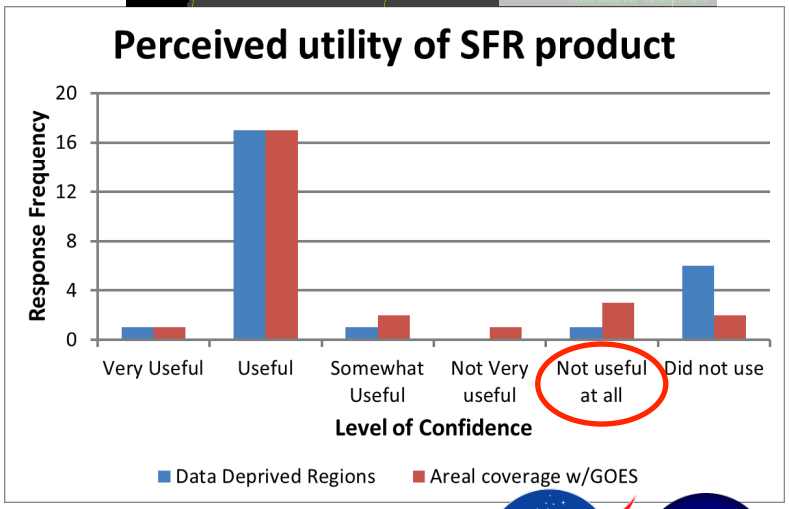
Assessed during Winter 2014

- 26 surveys, 10 blog posts, 50+ e-mails
- Most forecasters rated the product "Useful" or "Very Useful"

Revealed product issues impacting its applications in operations

- Large latency
- No retrievals under cold conditions (reason for all three "Not useful at all ratings")
- Inadequate detection of light snow





Assessment: Tracking Meteogram Tool

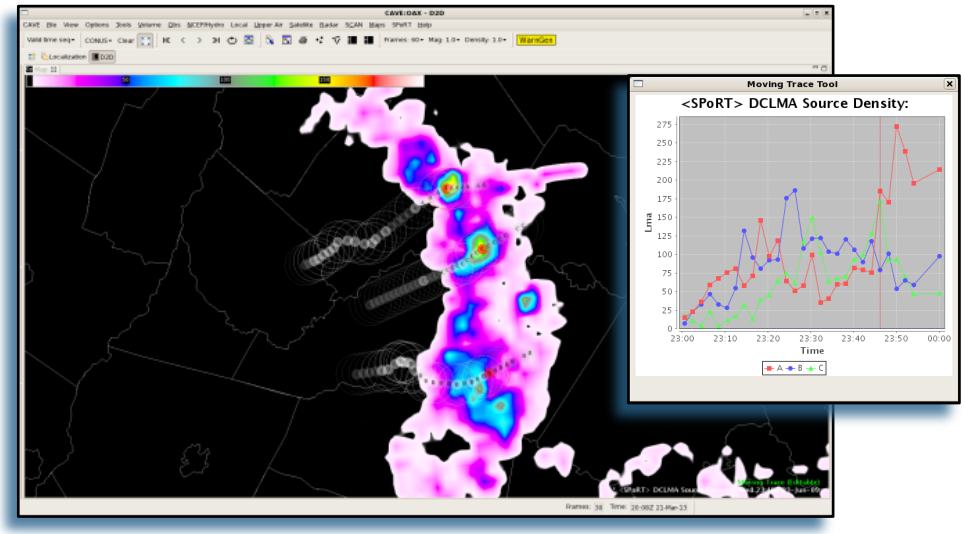
SPoRT leads an Experimental Products Development Team (EPDT) for community development of AWIPS II

Developed "Tracking Meteogram Tool", which allows forecasters to track features and create time series plots

Applies to numerical models, satellite imagery, radar data, and total lightning

Baselined in AWIPS 15.1.1

Demonstrated and confirmed as impactful and ready for use through NWS Operations Proving Ground in April 2014, as highlighted in their annual report



Tracking Meteogram used to assess total lightning jumps in thunderstorms

Testing Tracking Meteogram at Operations Proving Ground

Assessment: Total Lightning

SPoRT has been a leader in transitioning ground-based total lightning observations to prepare forecasters for GLM

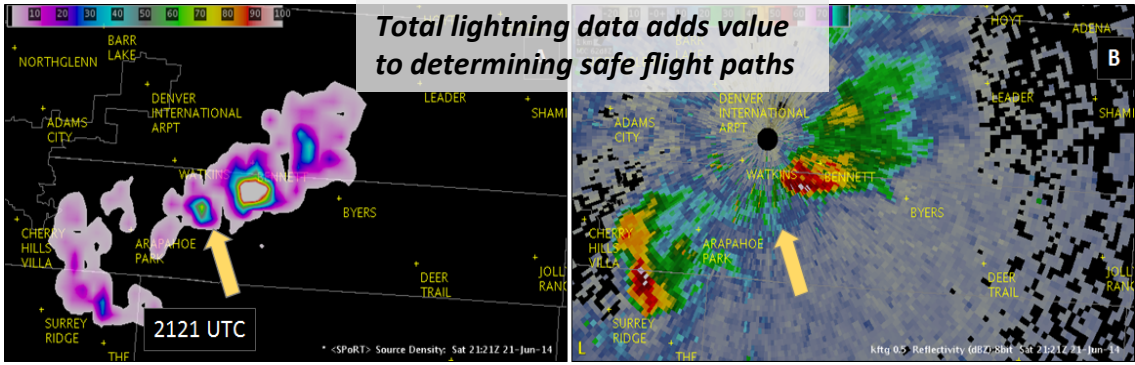
This year's assessment focused on aviation weather and lightning safety

Assessed during Summer/Fall 2014

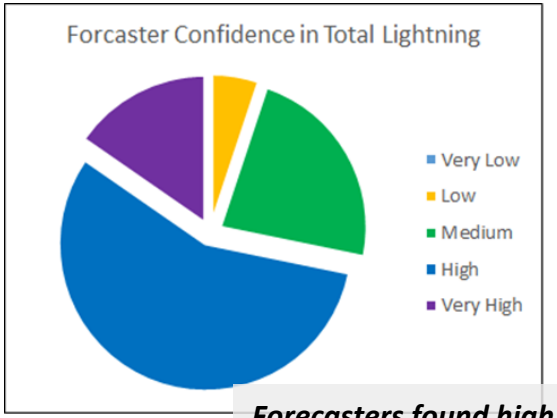
- 8 WFOs; 3 CWSUs
- 39 surveys, many e-mails

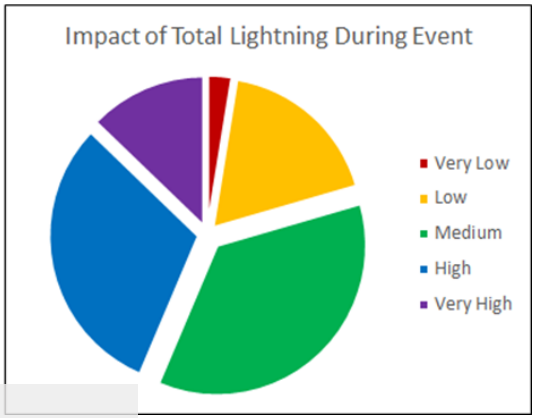
Revealed product issues impacting its applications in operations

- Temporal resolution of the data for 1-minute refresh appears noisy



Total lightning data adds value to determining safe flight paths





Forecasters found high confidence and impact in use of total lightning data

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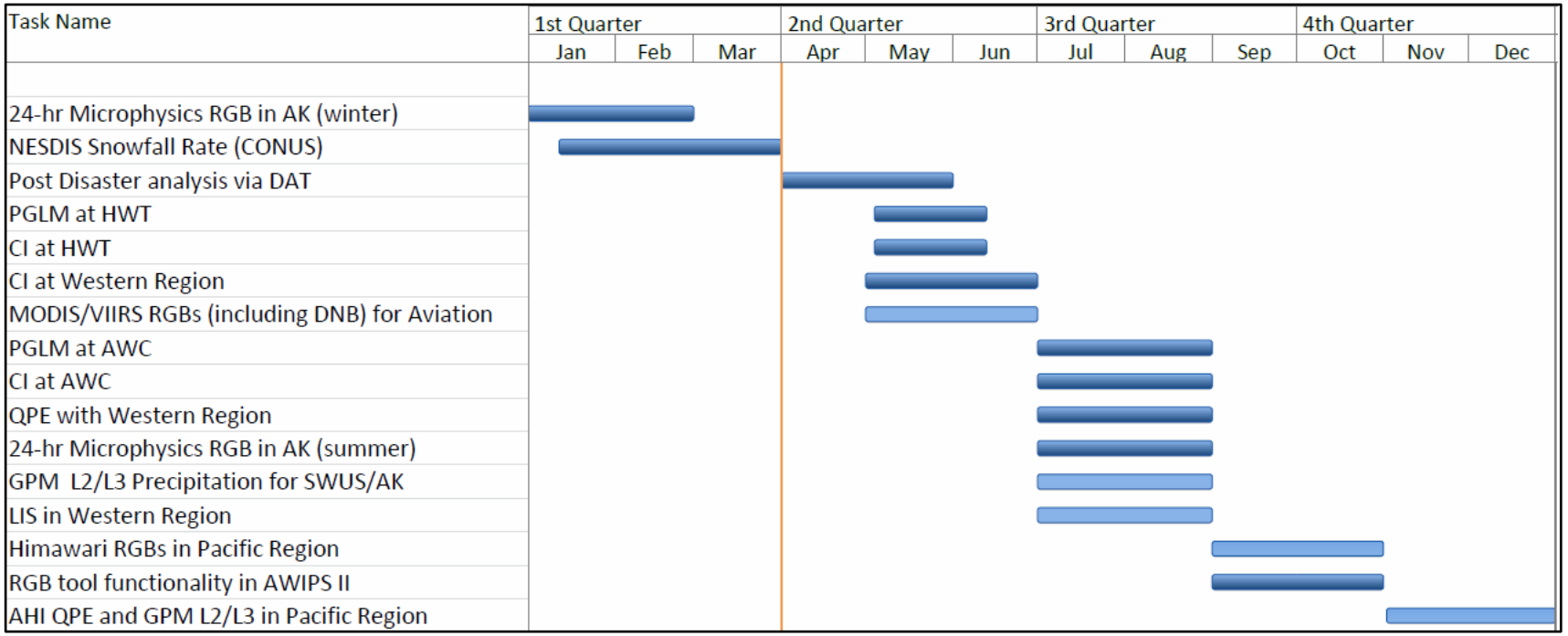


Planned Assessments for FY15/16

CI and PGLM at HWT and AWC (Spring/ Summer 2015)

Himawari RGB imagery for Pacific Region and National Centers (Summer 2015; depending on availability of AHI data)

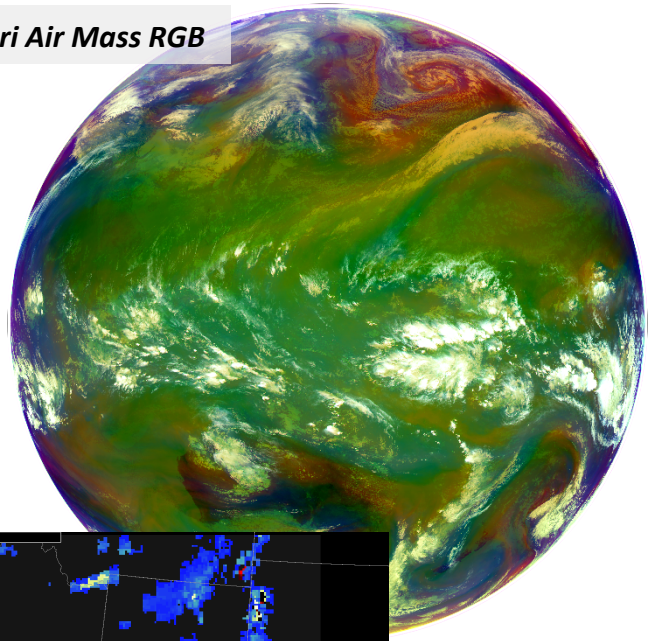
24-hour Microphysics RGBs with AK WFOs (Summer 2015)

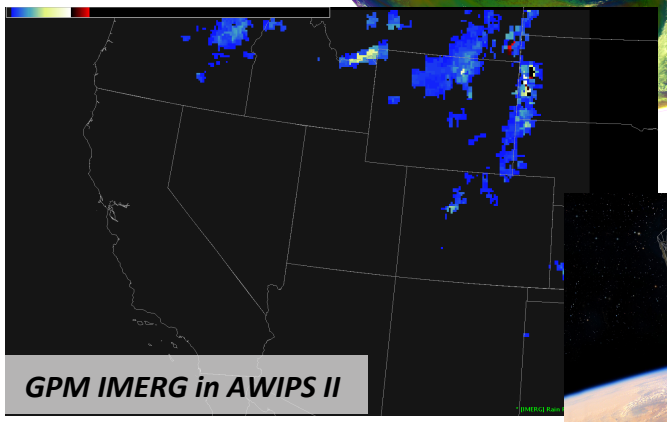
NESDIS QPE product in Western and Central Regions (Summer 2015)

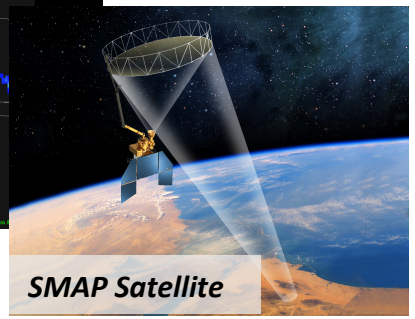
GPM L2 and L3 rain rate product for hydrology applications (Summer 2015)

- SWUS Monsoon (Summer 2015)
- AK River Forecast Centers (Summer 2015)
- Pacific Region (Fall 2015)

Evaluation of SMAP-enhanced soil moisture product from LIS for (Summer 2016)


Himawari Air Mass RGB


GPM IMERG in AWIPS II


SMAP Satellite

Summary

SPoRT works collaboratively with forecasters at the NWS to transition unique satellite observations and modeling capabilities to solve operational forecasting problems using a proven R2O/O2R paradigm

SPoRT works with other NOAA testbeds and satellite liaisons to demonstrate value-added products from current satellite and proxy products from emerging satellites to train forecasters on the use of next-generation capabilities

Follow us!

Website: http://weather.msfc.nasa.gov/sport/
Blog: https://nasasport.wordpress.com/
Twitter: @NASA_SPoRT
Facebook: NASA SPoRT Center

Back-Up Slides

Forecaster Training

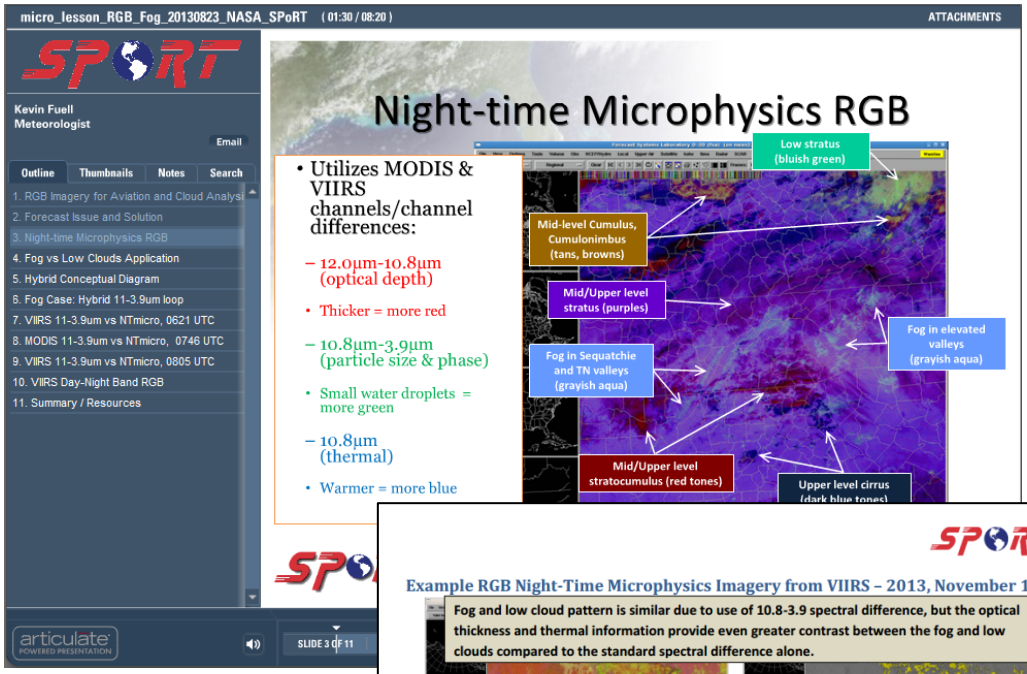
Training is developed to complement more conceptual training developed by COMET or NOAA's Training Office

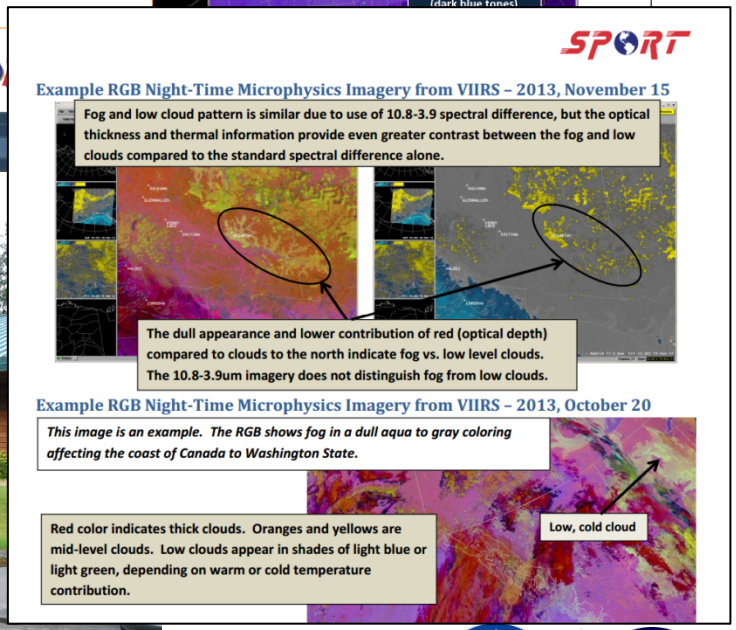
SPoRT training is generally shorter and more focused on specific forecast challenges being addressed during an assessment

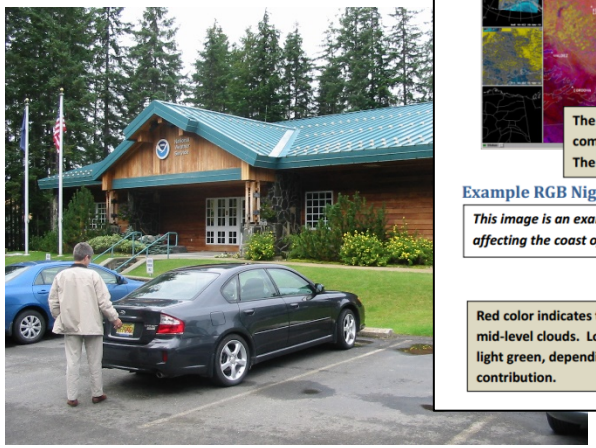
Use specific examples identified by forecasters during "trial" periods to develop training

Multiple flavors of training are needed to reach all forecaster learning styles

- Site visits
- Microlessons
- User-based, operational modules
- Quick Guides







Assessment Methodology

Assessment page

- Quantitative questions
- Open comments

Follow-up Emails/Phone calls

- Submitted feedback receives a follow-up via e-mail (“Thank You”, and questions).
- Info exchange with product developers

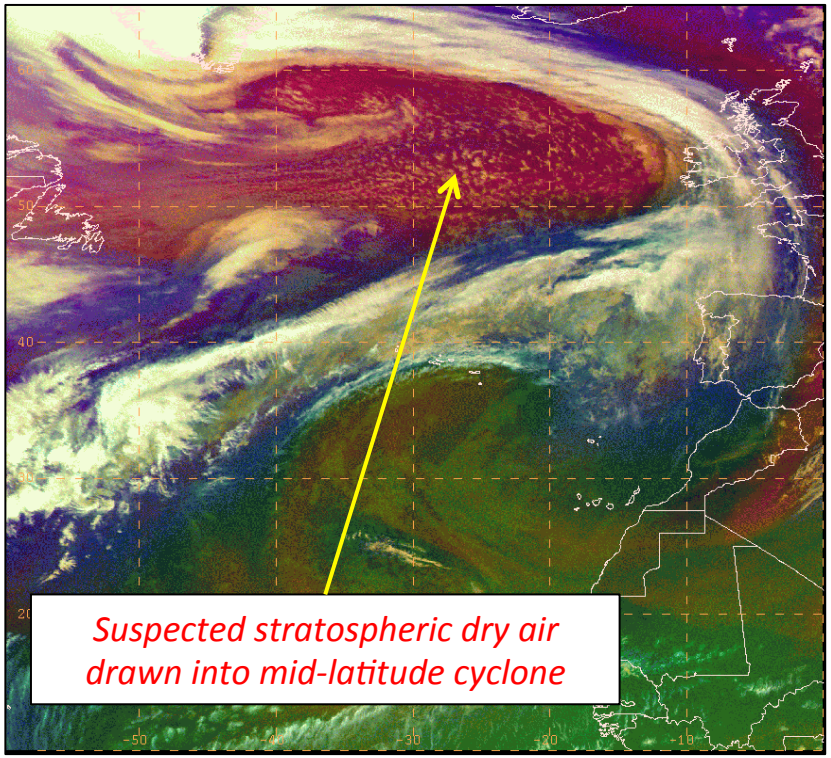
Wide World of SPoRT Blog (https://nasasport.wordpress.com/)

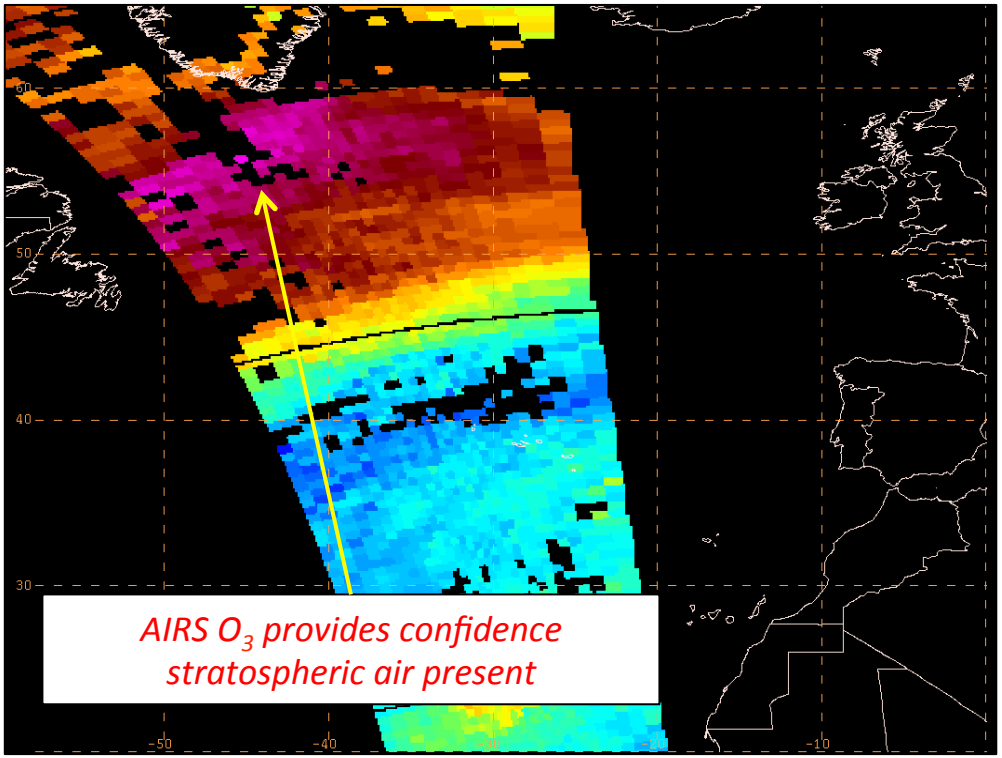
- Case examples

Assessment “Wrap-up” Telecon

Results in an Assessment Report

Assessment: Air Mass RGB & AIRS Ozone





National Center partners such as WPC and OPC use multispectral products from MODIS, VIIRS, and SEVIRI, but also incorporate profile information from AIRS to understand the influence of stratospheric air (via ozone) on the development and intensification of midlatitude cyclones.

"Reinforce the evidence from RGB of the descent of stratospheric air with tropopause folding."

"This has allowed me to have confidence in assessing the RGB Airmass product and also in conjunction with gridded GFS output that a perceived PV anomaly is real or not."

Assessment: Land Information System

High-resolution modeled soil moisture from the NASA Land Information System (LIS) were formatted for AWIPS II and transitioned to select SEUS WFOs

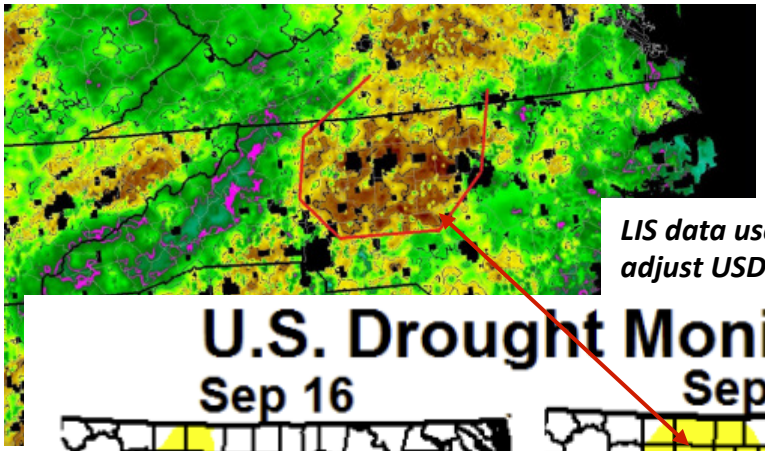
Soil moisture is useful for drought and areal flood detection and potential

Assessed during Summer/Fall 2014

- Huntsville, Raleigh, and Houston
- 28 surveys, 10 blog posts, many e-mails
- Input provided to U.S. Drought Monitor

Revealed product issues impacting its applications in operations

- Would like to know climatological significance of drought soil moisture for better drought guidance



LIS data used to adjust USDM